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ECLAC
Economic Commission for Latin
America and the Caribbean

IDNDR
International Decade for Natural
Disaster Reduction

MANUAL FOR ESTIMATING THE SOCIO-ECONOMIC EFFECTS OF NATURAL DISASTERS



United Nations
Economic Commission for Latin America
and the Caribbean

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FOREWORD

Natural disasters have a major impact on living conditions and economic development. In the industrialized countries, tremendous losses are sustained to the capital stock, while losses of life are usually very low because there are effective forecasting and warning systems. In the developing countries, on the other hand, disasters always result in heavy loss of life because there are no organization, prevention and evacuation systems. The impact on economic development is usually considerable, although capital stock losses may be less.

Based on statistics and additional estimates made by the ECLAC secretariat over the past 20 years, natural disasters can be said to have cost the Latin American and Caribbean region, in an average year, more than 6,000 lives and over US\$ 1.5 billion in economic losses.¹ This amounts to a large proportion of the population, generally the lower-income population, and is a major setback for governments' development efforts.

It is essential to design and implement planning and prevention schemes and measures to help reduce such losses and to have the means of determining, after each disaster, the amount and type of damage sustained, as the basis for rehabilitation and reconstruction efforts.

The second of these needs is hampered by the absence in the existing literature, of a comprehensive, uniform methodology for evaluating the socio-economic effects of disasters. However, the ECLAC secretariat, starting from some concepts advanced by UNDRO in the 1970s² and drawing on its own evaluation and monitoring experience already mentioned, has developed an evaluation tool for determining both the sectoral and the overall effects of a disaster as a guide for post-disaster rehabilitation and reconstruction processes.

This Manual describes that methodology. It is aimed at the professional whose job it is to evaluate the socio-economic impact of disasters in situations—which tend to be the norm in Latin America and the Caribbean—where little reliable quantitative information is available.

It has been prepared by compiling and systematizing the experience gained by numerous ECLAC secretariat staff and by some experts and consultants outside ECLAC. As a result, it draws on actual experience of the natural disasters that have occurred in the region in the past two decades.

¹ See J. Roberto Jovel, "Natural disasters and their economic and social impact", *CEPAL Review*, No. 38 (LC/G.1570-P), Santiago, Chile, August 1989.

² See Office of the United Nations Disaster Relief Coordinator (UNDRO), *Disaster Prevention and Mitigation: Compendium of Current Knowledge. Economic Aspects*, Volume 7, New York, 1979.

This version of the Manual is being issued thanks to the financial support provided by the Government of Italy under a technical cooperation project entitled "Natural disaster prevention in Latin America and the Caribbean". The intention is to gradually expand it by adding chapters on sectors or issues not originally covered or by elaborating on and revising chapters and sections of the original.

INTRODUCTION

Natural disasters, which are a frequent occurrence in Latin America, have a major impact on countries' social, economic and political situation. Barely a month passes without some part of the world being afflicted by floods, earthquakes, volcanic eruptions, accidents, massive fires, droughts, famines or some other major disaster. Such phenomena cause massive loss of life, directly or indirectly affect large sectors of the population and wreak major economic damage.

However, research shows that natural disasters cause more devastation in developing countries and that they hit the most disadvantaged population groups hardest. Over the years, the developed countries have devised various ways of protecting themselves from the consequences of disasters by anticipating their risks through prevention and planning measures. Few such measures have been taken in the developing countries, however, where a large proportion of the population lives in precarious conditions, crowded together in flimsy, unprotected dwellings on hillsides subject to landslides or on low land susceptible to massive flooding.

The geographical location and natural characteristics of Latin America and the Caribbean expose the region to frequent natural disasters. Although these disasters may vary in intensity, they usually entail loss of life and damage to socio-economic infrastructures. They also have a serious and persistent impact on the functioning of national economies.³

When a disaster occurs, along with the first emergency measures taken by the government and the community concerned, various national and international agencies offer relief, aid and assistance and are often even designated to coordinate the external cooperation received. However, this support, though important, represents only part of the total cost of the necessary process of post-disaster recovery. As a result, one of the most pressing tasks for the country concerned is to make an early, reliable preliminary assessment of the damage.

When a disaster has occurred and while the emergency is still at its height, it is absolutely essential to identify and quantify its effects as accurately as possible as a minimum guide for designing rehabilitation and reconstruction programmes and for identifying the international cooperation that will have to be channeled to the affected country for it to undertake such programmes. While the Office of the United Nations Disaster Relief Coordinator (UNDRO) deploys its programmes during the emergency or immediately after the disaster, ECLAC has often, particularly since

³ See J. Roberto Jovel, *op cit*

the early 1970s, assisted affected governments in the subsequent task of evaluating the disaster's direct and indirect effects and its impact on the main macroeconomic variables. The experience gained over the past two decades in evaluating the socio-economic effects of dozens of natural disasters of varying magnitude and intensity⁴ convinced the ECLAC authorities that it would be both advisable and desirable to conceptualize and standardize their findings in order to produce a manual or guide for general use in such situations.

The result was this Manual, which focuses on evaluating the socio-economic effects of disasters, classifying them as direct, indirect and secondary, and therefore omits any detailed description of the physical characteristics of the disaster itself or any mention of the emergency activities carried out immediately after it.

The emphasis is thus on the conceptual and methodological aspects of estimating the damage caused by a disaster both to capital stocks and to goods and services production flows, as well as its temporary effects on the behaviour of the principal macroeconomic aggregates. The hope is that the Manual will prove a useful tool for formulating short- and medium-term rehabilitation and reconstruction plans and programmes to be implemented once a disaster's emergency phase is over.

Its purpose, therefore, is to assist individuals and institutions involved in the identification and quantification of damage caused by a natural disaster, by providing a uniform, coherent methodology derived both from ECLAC experience and from the conceptual definitions originally advanced by UNDRO in this field.⁵

In addition to the objectives mentioned in the preceding paragraphs, it is hoped that the use of this Manual will yield the information needed to identify the social or economic sectors or geographical regions which, having borne the brunt of the disaster, must be given priority in the rehabilitation and reconstruction process. It is also hoped that it will make it easier to determine whether the affected country has sufficient capacity for this or whether and to what extent international cooperation will be needed and, in the latter case, what form such cooperation should take.

The evaluation must of course be carried out during the emergency phase. However, since the authorities will be understandably preoccupied with providing relief to the population, it will not be easy to obtain the information needed to evaluate the magnitude of the direct damage, still less the indirect and secondary effects.⁶ As a result, unsubstantiated and frequently conflicting figures will often be reported. It is therefore advisable to wait until the relevant authorities have completed a substantial

⁴ See at the end of this Manual the list of documents produced on this issue by ECLAC since 1972.

⁵ UNDRO, *op. cit.*

⁶ For a definition of these and other related concepts, see part 1. Methodological and conceptual aspects, of this Manual.

part of their emergency activities, so that the evaluation does not interfere with or jeopardize relief efforts. However, it is important not to wait so long that the results of the evaluation come too late to be of any use for guiding the rehabilitation and reconstruction process.

The various evaluation exercises carried out thus far cover issues in different orders and sequences, but all of them ultimately cover essentially the same aspects, subject of course to variations determined by the type and geographical scope of the disaster. They usually start by assessing the size of the affected population and how it has been affected. They then differentiate between the effects of the disaster on the "social sectors": education; health and housing; community services; and, lastly, on economic sectors. The breakdown which different evaluation exercises presented for economic sectors has depended on the scope of the disaster but also on the availability of information. An overall assessment has also been included, sometimes at the beginning but more often at the end of the corresponding document, comprising a recapitulation of the damage and an estimate of the disaster's impact on the behaviour of the main economic indicators during a period normally lasting one to two years after the disaster's occurrence but depending on the nature of the damage, sometimes lasting as much as five years.

Generally speaking, the Manual describes the methodology for those sectors or areas considered most relevant. As a result, it is not exhaustive but it is hoped that the definitions and calculation methods it presents and the information sources it suggests will provide the necessary basis for extending the evaluation process to sectors or areas not explicitly mentioned in it, for instance, tourism, mining, etc.

Based on the above considerations, the Manual is organized into five parts. The first covers general methodological and conceptual aspects, the second deals with estimating the effects of the disaster on social sectors (population, housing, health and education); the third describes its effects on the service infrastructure (drinking water and sewerage, transport and communications, electricity and power), the fourth covers damage to production sectors (agriculture, industry and trade); and, lastly, the fifth presents the methodology for aggregating direct and indirect damage and for measuring the disaster's impact on the main macroeconomic aggregates.